Paris to a remarkable altitude, as it has done on several previous occasions, carried a special apparatus which was moved by clockwork and which allowed a vacuum chamber to be opened, filled with air, and closed when the balloon was at or near its maximum height. The volume of the reservoir was about 6 liters, the altitude at which it was filled was 15,500 meters; the barometric pressure recorded at the time of filling was 140 millimeters. The experiment appears to have been completely successful, every source of trouble in the apparatus having been anticipated and provided for. A complete description of the apparatus and results is given by M. Cailletet in the *Comptes Rendus*, of the Academy of Sciences, Paris, March 8, 1897, from which we take the following account of the results of the chemical analysis. This analysis was entrusted to Müntz, who reported that the volume of about 6 liters of air secured at 15,500 meters, at a pressure of 140 milimeters and a probable temperature of about minus 66°, occupied a volume of 1.18581 liter when reduced to the standard pressure of 760 mm. and a temperature of 0° C. 100 volumes of this air contained 0.033 volume of carbonic acid gas; after being deprived of its carbonic acid gas, 100 volumes of this air contained 20.79 of oxygen, 78.27 of nitrogen, 0.94 of argon. The ratio of the argon to the sum total of the nitrogen and argon was 0.01185. M. Müntz adds the following remarks:

The results of the above analysis show, as was to have been anticipated, that at the altitude attained in this case, the chemical composition of the air does not differ notably from that of the lower strata, but these figures can only be accepted with some reserve; it is, in fact, necessary to still further perfect the method of securing the specimen of air so as to avoid any possible alteration in its composition. It will be necessary to employ for the lubrication of the stop-cock a mineral oil incapable of absorbing the slightest trace of oxygen or of emitting a trace of carbonic acid gas under the conditions that prevail in these experiments. It will also be necessary to make use of a vacuum chamber whose walls do not absorb a single trace of oxygen. In this respect a reservoir of glass would be ideal, but a reservoir of gilded copper would seem to me to equally fulfill the desired object. In the present case it is possible that the small proportion of carbonic acid gas, 0.033 in excess over that of normal air, 0.029, is due to the oxidation of the lubricant which could have furnished the tenth of a milligram corresponding to this excess. In the same way the small proportion of oxygen, 20.79, as compared with that of normal air, 20.96, and which for the volume of air collected represents 3 milligrams, could be due to the absorption of this gas by the lubricator and, especially, by the metallic walls of the tinned copper.

After eliminating all possible causes of error in this latest ascension we can decide with certainty whether or not there exist any real differences in the constitution of the air at various altitudes. For the methods of analyses with gases are to-day so perfect, thanks, especially to the labors of M. T. Schloesing, Jr., that excessively small differences would be shown if they existed, but, as is easily perceived, the air in the regions where it is actually possible to explore the atmosphere by means of the sounding balloon is subject to the effect of a stirring which renders its composition sensibly uniform with that of the lower strata; one ought, therefore, to expect only small differences in its composition, such as can only be demonstrated with certainty when the most minute precautions are taken. It will be easy to take account of the errors that are attributable to the retention of the air in its reservoir by introducing into the latter some air of known composition which can be analyzed at the end of a certain interval.

The Editor hopes that the above cautious remarks by so high an authority in science will serve to correct the sensational paragraphs that have been going the rounds of the newspapers to the effect that the results of this high ascension demonstrated that the composition of the atmosphere varies with increased altitude in such a way as to prove that a definite limit to the atmosphere exists at no great altitude above the earth and that this limit is diminishing.

METEOROLOGICAL NOTES BY CAPT. WM. SCORESBY, JR.

(*A*) STATIONARY CLOUDS ON MOUNTAIN TOPS.

In his journal of a voyage to the northern whale fishery and east coast of West Greenland, 1822 (Edinburgh, 1823), Scoresby says that he was on the 5th of September off the Faroe Islands, and remarks:

The tops of the higher cliffs of Kalsoc and Ostroe, it was remarked, were capped with clouds, which remained in a state of apparently calm repose upon the summits, while a breeze, little short of a gale of wind, carried all other clouds along with great velocity. This is a circumstance so common in these islands, and, indeed, in all mountainous countries, that it would scarcely have merited observation had it not formerly suggested to me an explanation of the phenomenon of the suspension of clouds, which, as far as I know, is new.[1] The force acting against the suspension of clouds is gravity, which, on account of the resistance that very minute substances, such as the almost invisible particles of vapor in clouds, meet with in their descent from the air, can be productive of no great velocity; but the force acting against the retention of clouds on the tops of mountains in boisterous weather is the wind, which may have a velocity of 50 miles an hour or upwards. Hence, whatever cause is sufficient for the retention of clouds upon mountains against the action of the wind must be sufficient (all other circumstances being the same) for the suspension of clouds in the air, where the tendency to quit their position is induced by a force perhaps not one-tenth so great as the former. In the case of the retention of clouds upon mountains, it might be objected that, notwithstanding a gale may be blowing in the lower parts of the atmosphere, the air on the tops of the mountains may be calm. It must be admitted that the various currents known to exist in the atmosphere at the same time in different strata might justify this supposition were there no facts that could be brought forward to prove the prevalence of the wind aloft as well as below in instances where the clouds were retained. These facts, indeed, being so much within every person's observation who has visited mountainous countries, scarcely requires an example. Two instances, however, may be given: On a former voyage, when the highest summit of Ostroe was observed to be covered with a stationary cloud during a strong gale, the lower atmosphere was full of those scattered clouds called by the sailors "scud," whose flight in storms is so striking and rapid. Some of these patches of cloud were evidently at the same level as that of the highest land, because in a large patch passing across the summit it was sometimes observed that a portion of it coalesced with the cloud reposing thereon, and the rest flew away, with undiminished velocity, to leeward. The other example that I have to mention relates to Ben Lomond. I ascended this mountain on a fine, clear day, in the month of October. There were, indeed, some flying clouds in the air, the wind being high, but these were small and few. The summit of Ben Lomond, however, was capped with a stationary cloud. This cloud proved to be of the nature of mist of the densest kind. The particles of vapor were remarkably small and were flying rapidly past me by the action of the wind. At the very top, indeed, the gale was so strong that I could scarcely keep my feet; yet the cloud steadily maintained its position for several hours. Now, as the cloud could not possibly remain stationary on the mountain without moving to windward with a velocity equal to that of the gale, a notion which it would be absurd to entertain, its apparent fixedness can only be attributed to progressive deposition of aqueous vapor, or formation, on the one hand, and to equal solution and dispersion, on the other. It is, therefore, absolutely certain that the stationary appearance of the cloud, in this instance, was the effect of condensation produced on the air as it approached the mountain and absorption as it receded from it, so that while the cloud seemed to a distant observer to be the same mass of vapour, neither varying in size nor form for a quarter of an hour together, it was in reality changing the whole of the particles of which it consisted perhaps every minute.

(*B*) GALES WITH RISING BAROMETER.

The strongest winds that are experienced in the United States may, perhaps, be classified as follows:

(*a*) Very local gusts attending thunderstorms and tornadoes; these are generally believed to be whirling and ascending winds, but this is not invariably the case, since for every descending mass of air there must be a corresponding ascending mass; at or near the surface of the earth the destructive gusts are more likely to be descending.

(*b*) Severe whirlwinds, which are certainly revolving winds, and on a much larger scale than in the tornado.

(*c*) Local straight-line winds, which Hinrichs calls "derechos;" these usually attend cyclonic storms, and, apparently, consist of denser cool or dry air descending to the ground.

(*d*) Straight-line winds on a larger scale, known as "northers," "northwesters," or "blizzards," which are also cold, dry, heavy air pushing outward and especially southward from an area of high pressure, and, probably, also slowly descending.

[1] The first observation of this circumstance occurred in 1820, while passing the Faroe Islands in a gale of wind. The theory of the suspension of clouds that was suggested by it was first communicated to the Liverpool Society of Travelers into Foreign Countries about two years ago.

When gales of this latter class reach any station the barometric pressure generally rises rapidly, whereas in gales of the class (*b*) the pressure first falls rapidly and then rises. Whirlwinds, viz, gales attending low pressures, had long been known to navigators throughout the tropical and equatorial regions, but northwesters, with rising barometer, were not well recognized by English navigators until the present century. The younger Scoresby, in his journal of a voyage on the eastern coast of west Greenland (Edinburgh, 1823, p. 358), says:

It is observable that the barometer (September 3, 1822), which had been at 28.35 for upwards of thirty hours before the commencement of the gale, began to rise the moment the gale attained its height. It rose about .4 of an inch in a very short interval. This rising of the mercury at the commencement of a storm is a circumstance that I have frequently observed. It is not indicative, however, either of a short duration or an approaching cessation of the gale, for after such a rise I have known many gales to continue for thirty or forty hours unabated.

OPENING OF NAVIGATION IN CANADA.

The following table, showing the average date of the opening of navigation at Canadian ports during the past twenty years, is published by Prof. R. F. Stupart on "The Monthly Weather Map" for February, 1897:

Canadian Ports.	Dates of opening.		
	Earliest.	Latest.	Average.
Lake Superior: Port Arthur	Mar. 18	May 22	Apr. 26
St. Marys River: Sault Ste. Marie	Apr. 8	May 12	Apr. 27
St. Claire River: Sarnia.	Mar. 7	May 3	Apr. 5
Lake Erie: Port Colborne	Apr. 15	May 9	Apr. 25
Lake Ontario: Burlington Bay	Mar. 1	Apr. 28	Apr. 11
Lake Ontario: Toronto	Feb. 13	Apr. 25	Mar. 28
Lake Ontario: Kingston	Mar. 6	Apr. 24	Apr. 5
St. Lawrence River: Montreal	Mar. 30	May 5	Apr. 21

ANNOUNCEMENT BY THE SECRETARY OF AGRICULTURE.

UNITED STATES DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D. C., March 23, 1897.

To the Chiefs of the Scientific Divisions of the U. S. Department of Agriculture:

Dr. Charles W. Dabney, Jr., of Tennessee, has this day been appointed as "Special Agent in charge of Scientific and Statistical Investigations" in this Department.

It will be the duty of this special agent to consider, for the information of the Secretary of Agriculture, the scientific and technical work of the divisions of this Department specified below, to supervise the same under his direction, and to make recommendations respecting their scientific work, reports, papers, etc., for his action.

The following divisions and offices are hereby directed to report to the Secretary through this special agent:

Division of Forestry.
Division of Botany.
Division of Vegetable Physiology and Pathology.
Division of Agrostology.
Division of Pomology.
Division of Chemistry.
Division of Biological Survey.
Division of Soils.
Division of Entomology.
Office of Experiment Stations.
Office of Fiber Investigations.
Section of Foreign Markets and Special Statistical Investigations, Cotton, and Tobacco.

All questions and official correspondence involving the scientific and technical work of said divisions and offices will be submitted to this special agent for approval and signature, unless such correspondence involves administrative policy, in which case it will be signed by the Secretary.

JAMES WILSON,
Secretary of Agriculture.

METEOROLOGICAL TABLES.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

For text descriptive of tables and charts see page 20 of REVIEW for January, 1897.